

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claim 17 is pending in this case. Claims 11-16 were previously canceled and Claims 1-10 are presently canceled without prejudice or disclaimer. Claim 17 is added by the present amendment. New Claim 17 is supported by the specification and original claims.¹ New Claim 17 adds no new matter.

The outstanding Official Action objected to the specification as containing informalities. Claims 1, 2, and 6 were rejected under 35 U.S.C. §102(b) as anticipated by Hayashi et al. (United States Patent No. 6,350,316, hereinafter "Hayashi"). Claims 1-3, 7-8, and 10 were rejected under 35 U.S.C. §102(b) as anticipated by Takamori et al. (United States Patent No. 6,306,455, hereinafter "Takamori"). Claims 4 and 5 were rejected under 35 U.S.C. §103(a) as unpatentable over Takamori. Claim 9 was rejected under 35 U.S.C. §103(a) as unpatentable over Takamori and further in view of Nakayama et al. (United States Patent No. 6,306,455, hereinafter "Nakayama").

In response to the first objection to the specification, applicant refers to MPEP §608.01(p). "The limitations on material which may be incorporated by reference in U.S. patent applications which are to issue as U.S. patents do not apply to applications relied on only to establish an earlier effective filing date under 35 U.S.C. §119 or 35 U.S.C. §120." Since Japanese Patent Application No. 11-193671 is relied on for an earlier effective filing date under 35 U.S.C. §119, applicant respectfully submits that Japanese Patent Application No. 11-193671 may properly be incorporated by reference in the present specification.

¹See e.g. the Specification at page 23, line 17 to page 28, line 8.

With regard to the other informalities cited in the specification, the specification has been amended to correct these informalities. No new matter has been added. Accordingly, the objection to the specification is believed to have been overcome.

Claims 1-10 have been canceled, making the present prior art based rejections moot. To the extent the present rejections apply to new Claim 17, applicant respectfully traverses the rejections.

Amended Claim 17 recites a method for forming a layer insulating film on a semiconductor substrate by spin coating, comprising, *inter alia*, the steps of:

(d) cooling the substrate when the processing solution temperature TL is higher than the substrate temperature TS, and heating the substrate in an inert atmosphere when the processing solution temperature TL is lower than the substrate temperature TS;

(e) while rotating the substrate by the spin chuck, supplying the first processing solution onto the front surface of the substrate and spreading the first processing solution over the front surface of the substrate by action of centrifugal force, thereby adhesion-promoting the front surface of the substrate with the first processing solution;

(f) removing the first processing solution from the substrate by further rotating the substrate by the spin chuck, thereby drying the front surface of the substrate; and

(g) while supplying a film forming solution serving as a second processing solution onto the front surface of the substrate, rotating the substrate by the spin chuck and spreading the second processing solution over the front surface by action of centrifugal force, thereby forming a layer insulating film,

wherein the steps (d) to (g) are continuously performed in the cup of step (c).

Hayashi teaches that a film may be formed by cooling a substrate with a cooling plate (CPL) 24, 26, transferring the substrate via (TRS) 25 to a first coating process unit (SCT) 13, spin coating the substrate with a first solution in the first coating process unit (SCT) 13, transferring the substrate to the cooling plates (CPL) 24, 26, transferring the substrate to a second coating process unit (SCT) 12, and spin-coating the substrate with a second solution

in the second coating process unit (SCT) 12.² Applicant respectfully submits that there is no teaching or suggestion in Hayashi to control the temperature of a substrate, spin-coat the substrate with a first solution, spin dry the substrate, and spin-coat the substrate with a second solution, continuously in a single cup, as recited in Claim 17.

According to the method disclosed in Hayashi, the processing using the first processing solution and the processing using the second processing solution are performed in different cups of the different coating process units 12 and 13. Because of this, after the processing using the first processing solution and the first coating process unit is performed, the substrate is carried from the first coating process unit cup to the other cup in which the processing using the second processing unit and second processing solution is performed.

In contrast, according to the method of the present invention, the ADP processing and the layer-insulating-film coating processing are continuously performed in the same cup. Because of this, the time for carrying the substrate from one cup to another is unnecessary, the adhesion of particles to the substrate can be prevented, and the throughput can be improved.

In addition, according to the method of the present invention, because the temperature of the substrate is regulated in an inert atmosphere in accordance with the processing solution temperature TL, the efficiency of the ADP processing is improved.

Claim 17 also recites, “regulating the temperature of an adhesion promoter solution serving as a first processing solution to a predetermined processing solution temperature TL.”

Takamori discloses a substrate processing method for forming a resist coating on a liquid crystal display (LCD) substrate comprising a transfer mechanism, a cooling unit, a coating unit, and a peripheral resist removing section.³ Takamori teaches that the substrate is cooled by the cooling unit, transferred to the coating unit by the transfer mechanism, spin-

²See Hayashi at column 13, lines 3-21.

³See Takamori at column 5, lines 27-67.

coated with a solvent and a resist solution, and transferred to a peripheral resist removing section by the transfer mechanism.⁴ Applicant respectfully submits that Takamori does not teach or suggest the use of an adhesion promotion solution, much less regulating the temperature of an adhesion processing solution to a predetermined processing solution temperature TL, as recited in Claim 17. Instead, Takamori teaches that the first solution is a solvent or thinner (resist removing solution).⁵

Applicant further submits that there is no teaching or suggestion in Takamori to control the temperature of a substrate, spin-coat the substrate with a first adhesion promotion solution, spin dry the substrate, and spin-coat the substrate with a second solution, thereby forming a layer insulating film, continuously in a single cup, as recited in Claim 17.

Nakayama discloses a thin-film coating apparatus comprising a solvent supply source and an inert gas source.⁶ Nakayama teaches that a substrate can be spin-coated with a single solvent or coating solution in an inert gas atmosphere.⁷ Applicant respectfully submits that there is no teaching or suggestion in Nakayama for using an adhesion promotion solution, an insulating layer forming solution, or for multiple solvents in a single apparatus.

In fact, Nakayama teaches away from the present invention in that Nakayama teaches that excess solvent is collected in a reservoir at the bottom of the apparatus and recycled by pumping the excess solvent into the solvent tank.⁸ If multiple solutions were used, as claimed in Claim 17, the solutions would mix in the solvent reservoir. Thus, applicant respectfully submits that there is no teaching or suggestion in Nakayama to control the temperature of a substrate, spin-coat the substrate with a first adhesion promotion solution, spin dry the substrate, and spin-coat the substrate with a second solution, thereby forming a layer insulating film, continuously in a single cup, as recited in Claim 17.

⁴See Takamori at column 16, line 30 to column 18, line 21.

⁵See Takamori at column 17, lines 61-63 and column 15, lines 3-4.

⁶See Nakayama at column 2, lines 57-62.

⁷See Nakayama at column 3, line 20 to column 4, line 2.

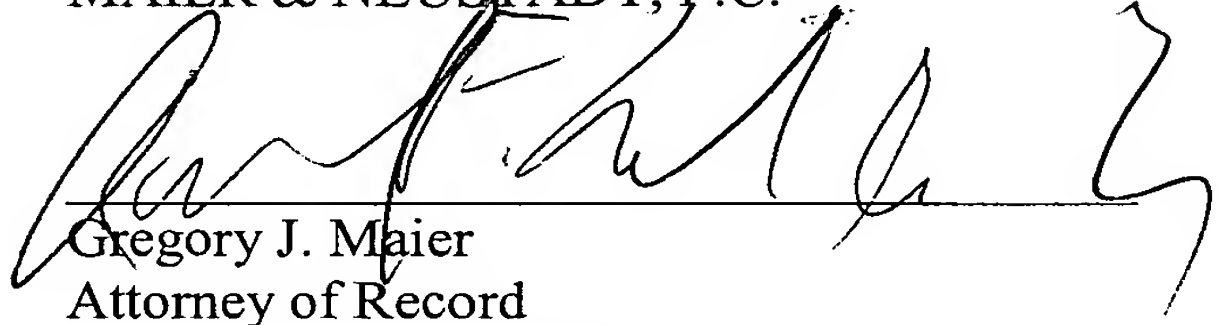
⁸See Nakayama at column 2, lines 51-56 and column 3, lines 48-52.

Since the cited references do not, alone or in combination, teach or suggest all of the elements of Claim 17, applicant respectfully submits that Claim 17 is patentable over the cited references.

Accordingly, the outstanding rejections are traversed and the pending claim is believed to be in condition for formal allowance. An early and favorable action to that effect is, therefore, respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Gregory J. Maier
Attorney of Record
Registration No. 25,599

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 08/03)

Raymond F. Cardillo, Jr.
Registration No. 40,440